

1 ABSTRACT OF THE DISCLOSURE

2 A method of forming a thin film transistor relative to a substrate
3 includes, a) providing a thin film transistor layer of polycrystalline
4 material on a substrate, the polycrystalline material comprising grain
5 boundaries; b) providing a fluorine containing layer adjacent the
6 polycrystalline thin film layer; c) annealing the fluorine containing layer
7 at a temperature and for a time period which in combination are
8 effective to drive fluorine from the fluorine containing layer into the
9 polycrystalline thin film layer and incorporate fluorine within the grain
10 boundaries to passivate said grain boundaries; and d) providing a
11 transistor gate operatively adjacent the thin film transistor layer. The
12 thin film transistor can be fabricated to be bottom gated or top gated.
13 A buffering layer can be provided intermediate the thin film transistor
14 layer and the fluorine containing layer, with the buffering layer being
15 transmissive of fluorine from the fluorine containing layer during the
16 annealing. Preferably, the annealing temperature is both sufficiently high
17 to drive fluorine from the fluorine containing layer into the
18 polycrystalline thin film layer and incorporate fluorine within the grain
19 boundaries to passivate said grain boundaries, but sufficiently low to
20 prevent chemical reaction of the fluorine containing layer with the
21 polycrystalline thin film layer.
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